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SOYBEANS AND SOYBEAN PRODUCTS AS FOOD

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OF AGRICULTURE

WITH SOYBEANS and soybean products taking a prominent place as food in the United States, many consumers want to know more about them.

This publication answers such questions as:

What are the essential facts about the nutritive values of soybeans and soybean products?

How large is the production of soybeans in the United States?

How are such soybean products as flour, grits, and flakes used as food?

How are green vegetable soybeans grown?

How are soybean "milk" and curd made at home?

How are soybean sprouts grown at home, and how are they used?

The Department of Agriculture also publishes a pamphlet containing many recipes for soybean flour and grits—AWI–73, Cooking With Soya Flour and Grits—and Farmers' Bulletins on soybean culture and varieties, soybean utilization, soybean hay and seed production, and soybean diseases.

Washington, D. C. Issued December 1943

Soybeans *and* Soybean Products *as* *Food*

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CONTENTS

	Page		Page
Nutritive values of soybeans	1	Soybeans as a green or dried vegetable	6
Why soybean protein is important	1	Varieties	6
Minerals and vitamins of soybeans	2	Growing and harvesting	8
The fat of soybeans—soybean oil	2	Preparation and cooking	10
Recent increase in soybean production	3	Soybean "milk"	10
Soybean products	3	Soybean curd	12
Soya flour	4	Soybean sprouts	12
Soya grits, flakes, and meats	6	Other edible soybean products	14
Soya with sausage and in soup	6		

CHANGES in eating habits are an inevitable result of war. Fortunately, in this country such changes have not meant nutritionally poorer diets, though some of the essential food elements have had to be obtained in part from unaccustomed sources. For example, the soybean, rich in protein and relatively low in cost, has now come into the picture as a protein food to supplement animal products—meat, eggs, milk, and cheese—which have traditionally supplied a large part of our protein needs. As the nutritive values and good eating qualities of soybeans and soya products become more familiar, these foods will undoubtedly play a larger part in our diet.

NUTRITIVE VALUES OF SOYBEANS

Why Soybean Protein is Important

No matter how many minerals and vitamins or how much carbohydrate and fat a diet may supply, it will not support life if protein is lacking. Food protein is the raw material of which muscle and other tissues, hair, nails, and skin are largely made. Children need it for growth and adults for body maintenance.

Proteins differ in nutritive quality. A food contains a "complete" protein if it can serve as the sole source of the protein that is needed

[1] This publication was prepared from material supplied by the laboratories of the Agricultural Research Administration, which includes the Bureaus of Agricultural and Industrial Chemistry; Animal Industry; Dairy Industry; Entomology and Plant Quarantine; Human Nutrition and Home Economics; Plant Industry, Soils, and Agricultural Engineering; and the Office of Experiment Stations.

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by the body. An "incomplete" protein alone will not sustain life.[2] Animal proteins are usually complete and of high nutritional quality. Most plant proteins, on the other hand, are incomplete, but they vary widely in nutritional value. Among the best of the plant proteins are those of soybeans, peanuts, and cottonseed. Soybeans contain 30 to 50 percent of protein that approaches animal protein in quality.

Except in the simplest kind of diet, human beings do not get all their protein from one source; proteins come from different sources and tend to supplement each other. The protein of cereal grains, for example, is inadequate alone, but this does not mean that it is not important—merely that it needs to be supplemented by other proteins. It has been shown, for example, that the proteins of soybean flour admirably supplement those of wheat flour, so that the combination is more efficient nutritionally than either alone.

Like many other proteins, those of soybeans may cause allergic reactions in some individuals. There is good reason to believe that such reactions to soybean foods will be extremely rare, but persons who have experienced allergic disturbances from any cause may reasonably be cautious in trying any new food.

Minerals and Vitamins of Soybeans

Soybeans are rich in phosphorus and are a good source of available iron. A number of other mineral elements required by the body, including copper, sodium, potassium, and magnesium, are found in soybeans.

Soybeans contain some calcium, an important mineral that is likely to be deficient in low-cost diets, and contribute to the total calcium requirements, though they cannot be relied on as the sole source. It would take 10 ounces of dry soybeans, for example, to supply as much calcium as a pint of milk, and this is far more than anyone is likely to eat in a day.

Vitamins of the B complex—thiamine, or B_1, riboflavin, and niacin—are found in soybeans in quantities comparable to those in meat, milk, and eggs. But here again it is not possible to consume enough soybeans in a day to satisfy the full requirement. However, when soybean products are used to extend or supplement meat or eggs, there is no reduction in the vitamin B value of the dish. Likewise, when soya products are added to cereals the total B vitamin value is maintained, since these nutrients are present in soybeans in about the same amounts as in the cereal grains.

If eaten raw shortly after sprouting, soybean sprouts are a useful source of vitamin C. When sprouts are cooked, losses occur, varying with the method of cooking.

The Fat of Soybeans—Soybean Oil

Fat is an important source of energy and of certain essential nutritive factors. Like protein, it tends to become scarce and expensive

[2] Proteins are made up of amino acids, of which 22 are now known. Some of these—more than a third—must be obtained by human beings from their food, and for that reason are sometimes called the essential amino acids. The others can be manufactured in the body, although they are also obtained from food. An incomplete protein is very low or is lacking in one or more of the amino acids that we cannot make in our own bodies. A protein is said to supplement another when it supplies one or more of the essential amino acids lacking or present in insufficient amounts in the second protein. Thus a number of proteins, each of which is incomplete in itself, may, in the right combination, provide adequate protein nutrition.

under war conditions. The fat, or oil, of soybeans is largely extracted and used both as an edible oil and as a raw material in industrial products and processes.[3] The greater portion goes into food products, including shortenings, cooking oils, margarine, salad oil, and mayonnaise. Thus for some time soybeans have been contributing to our diets more than most people realize. Soybeans have a fat content of about 20 percent of their dry weight.

RECENT INCREASE IN SOYBEAN PRODUCTION

Soybean production in the United States has increased enormously in the past two decades. In 1942 nearly 210 million bushels of soybeans were produced on about 11 million acres. If the 4.6 million acres on which soybean plants were grown for forage and other purposes are added to this figure, only five other crops—corn, wheat, hay, oats, and cotton—occupied more land in the United States in that year. These figures contrast strikingly with those of 1924, when less than 5 million bushels of soybeans were harvested from 448,000 acres (fig. 1).

This phenomenal rise in production was made possible largely by the introduction into the United States by the Department of Agriculture in the 1920's and early 1930's of more than 2,500 types of soybeans from their native Asia and their breeding and adaptation to conditions here.[4] Also important was the simultaneous expansion of the soybean oil industry. The production of soybean oil rose from 40 million pounds in 1931 to over 600 million in 1941.

SOYBEAN PRODUCTS

When soybeans are crushed for oil, a residue is left which contains all the protein and minerals and most of the vitamins of the soybeans. This meal or cake is an important livestock feed and also has industrial uses.[3] When soybeans are made into food products for human use, the oil may or may not be extracted. Only carefully selected and treated soybeans are used in making soybean food products, and they are made in modern sanitary food plants.

Soybean meal that is fed to livestock contributes indirectly to human nutrition through the protein of meat, milk, and eggs, into which the animals convert the soybean protein. But these animal products can be satisfactorily and inexpensively supplemented in human diets by soybean products eaten directly.

It is as a protein supplement to wheat flour and other foods that the nutritional values of the soybean can best be utilized on a large scale. Commercially, soybean products can be included in soups, macaroni, cereals, combinations with meat, pancake mixes, and other foods. In the home, soybean flour or grits can be used, not as a substitute for wheat flour, but combined with it and other foods to increase the protein value of home-made breads, pastries, pancakes, meat loaves, gravies, stews, soups, cookies, and other products. Recipes for using

[3] Industrial products in which soybean oil and soybean meal are used include plastics, glue, soaps, glycerin, celluloid, rubber substitutes, paints, linoleum, paper sizing, textile dressing, waterproofing, candles, lecithin, and lubricating oil.

[4] W. J. Morse, of the Bureau of Plant Industry, Soils, and Agricultural Engineering, spent 2 years in the Orient collecting 10,000 samples of soybean seed, which he brought to the United States. He has also taken a leading part in varietal adaptation and improvement work.

soya in soups, meats, breads, desserts, and other dishes will be found in the pamphlet Cooking With Soya Flour and Grits.[5]

The addition of a soybean product changes the flavor of the food somewhat in proportion to the amount used. The new taste is most often described as nutlike and is pleasing to most people.

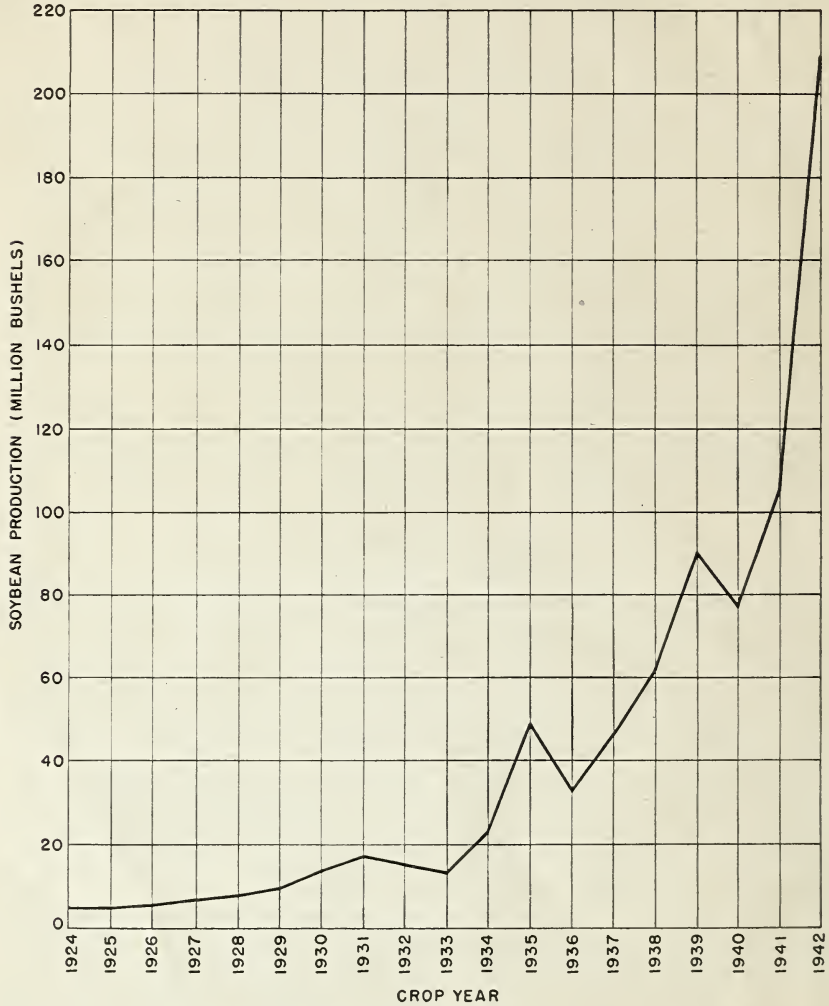

FIGURE 1.—The curve shot upward when soybean production doubled in a single year as a result of wartime needs.

SOYA FLOUR

One of the most important soybean products is flour, usually called soya or soy flour. In making flour from soybeans, the hulls, or seed coats, are first removed and then the beans go through a process known

[5] This publication may be obtained from the Office of Information, U. S. Department of Agriculture, Washington 25, D. C.

as debittering. This is necessary because of the unpleasant bitter or "beany" taste of raw soybeans of the varieties from which flour is made. Several methods of debittering are in common use, some employing steam and a few using chemicals. Many of these processes are patented. Most of them involve heating with steam, which performs two important functions besides debittering—it improves the nutritive value of the protein and makes it possible to keep the flour for longer periods. Flour ground from raw soybeans would have a tendency to become rancid in a short time.

There are two general types of soya flour—full-fat (or high-fat) and low-fat. Full-fat flour is made from the debittered whole beans with the seed coats removed; low-fat flour is of two types, expeller

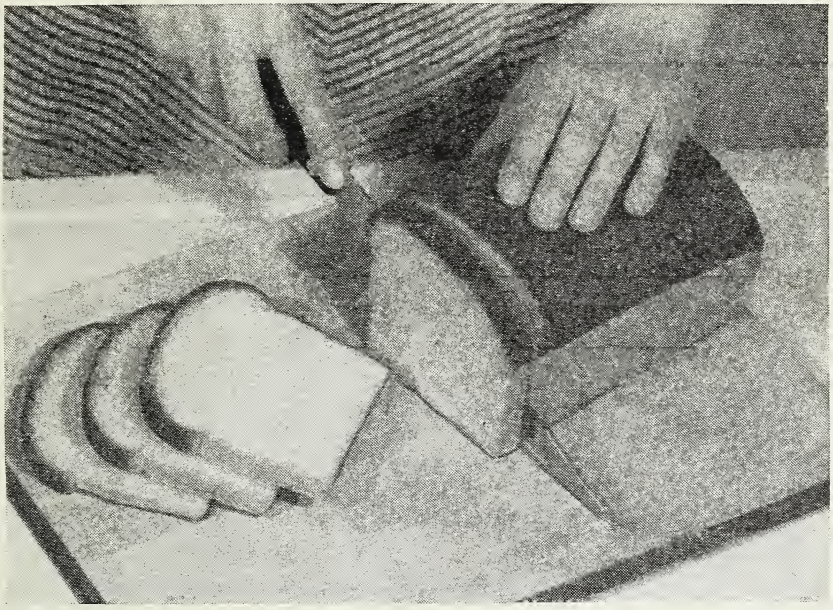

FIGURE 2.—Soya flour gives a rich flavor to the crust and the crumb of home-made bread and increases the nutritive value.

or extracted, made either from beans from which the oil has been expelled by pressure or from cracked or flaked debittered beans from which the oil has been extracted by a solvent. Full-fat flour contains about 20 percent of oil and 40 percent of protein; expeller-type low-fat (sometimes called medium-fat) flour, 4½ to 8 percent oil and 45 to 50 percent protein; and low-fat extracted flour, less than 4½ percent fat and 50 to 53 percent protein.

Government specifications for soya flour to be used for food require that it be processed from high-quality, sound, clean, dehulled, and debittered soybeans. Standards of cleanliness and quality for the finished product are also high.

Soya flour is different from wheat flour in many ways. It is lacking in gluten and very low in starch and cannot be used alone for making bread. Primarily a protein concentrate, soya flour's chief function is to add nutritive value to other foods (fig. 2).

Soya Grits, Flakes, and Meats

Three other manufactured soya products are grits, flakes, and bean meats. Great improvement in the flavor of all these products, as well as in the flour, has recently been made.

Soya grits, which, like the flour, may be full-fat or low-fat, depending on whether they are made from whole soybeans or from the press cake or extracted flakes, are less finely ground than flour. Some are fairly coarse; others are about as fine as corn meal. They can be mixed with corn meal to make spoon bread, mush, or muffins; they can be used in gingerbread, cereal mixtures, such as whole wheat or oatmeal, soups (fig. 3), sausages, meat loaves (fig. 4), and stews. Ten to 30 percent of soya grits can be combined with many products with desirable enrichment in protein, B vitamins, and minerals. For recipes, see the publication mentioned on page 4.

Soy flakes are usually the product of solvent extraction and are therefore low in fat and high in protein. They resemble fine rolled oats, but, like soy grits, are of different degrees of fineness. Added to oatmeal and other cereals, they increase the nutritive value.

Soybean meats are split or coarsely ground soybeans, dehulled and debittered. They are chiefly used in place of roasted peanuts in confectionery and baked goods, but they can also be cooked and eaten like navy beans.

Soya with Sausage and in Soup

Ten percent of soybean flour or grits added to sausage meat may increase the total protein content of this food combination over that of sausage alone by about 27 percent without affecting the flavor. Specifications for soybean products to be added to sausage meat include requirements for size of particles, water content, tests for bacteria, fiber content, fat content, and packaging. When such mixtures are sold commercially the label should indicate the ingredients.

Soybean products are being used by soup manufacturers in many types of soup powders. Millions of pounds of such soups have been used in the school-lunch program and for shipment under lend-lease, and a few are already available in grocery stores. Soya flour or grits give soups higher nutritive value and a desirable body and flavor. These soups are made from a wide variety of formulas, which call for such other ingredients as navy or lima bean powder, green or yellow pea powder, dry skim milk, dried vegetables, and seasonings. Usually up to 25 or 30 percent of a soya product is used.

SOYBEANS AS A GREEN OR DRIED VEGETABLE

Vegetable soybeans have been raised mostly in home gardens for family or local use. Several State agricultural experiment stations and the United States Department of Agriculture have made garden tests of seed to determine the best varieties for local conditions. Soybeans make an excellent Victory Garden crop in most parts of the country.

Varieties

Choice of variety is a primary consideration in growing soybeans for any purpose. Thousands of varieties have been introduced into

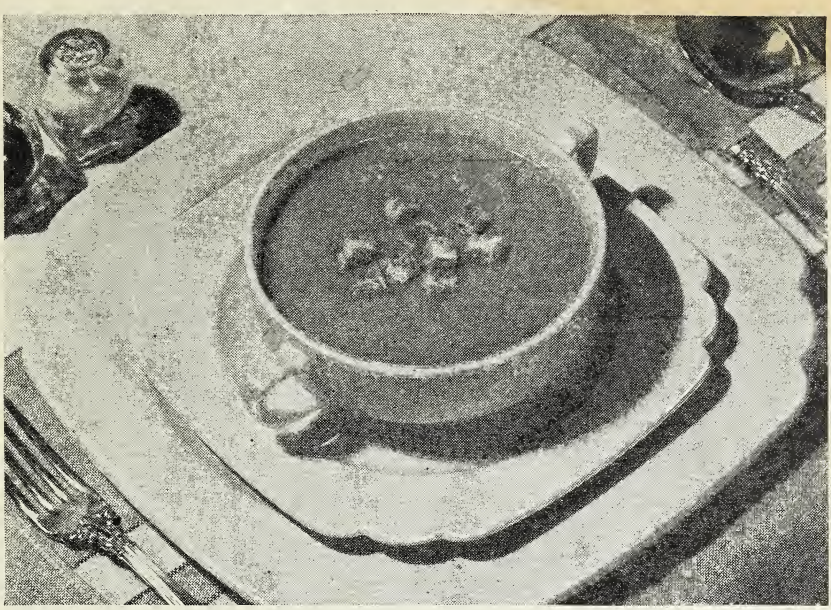

FIGURE 3.—From soup to nuts—which may be salted soys—every course could include soybeans in some form. Nourishing soy soup might start dinner or be the main hot dish at lunch or supper.

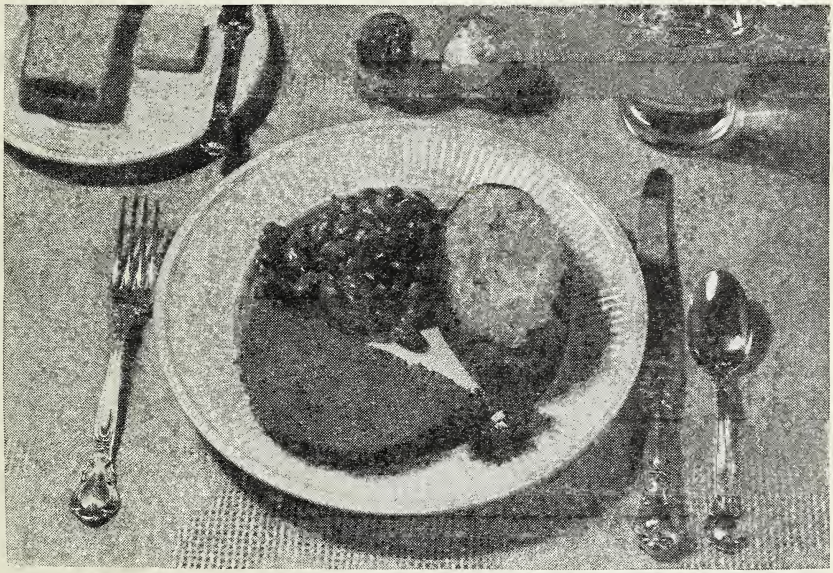

FIGURE 4.—Soya flour or grits in a meat loaf make the meat go further with no reduction in protein. Green soybeans add a colorful vegetable to the dinner plate.

this country from Asia. The range in length of time from planting to maturity among these varieties is 75 to 200 days or more, and there are wide differences in adaptation to soil and climate, as well as in size, shape, color, composition, and quality of seed. Some varieties are especially suited to certain localities and for certain purposes, but the same variety may behave differently under different climatic conditions.

Varieties best for oil and meal production have yellow seeds with a high oil content. Forage types are generally those with small black or brown seeds, fine stems, and abundant foliage. The most suitable varieties for green shelled or dried beans have straw-yellow or olive-yellow seeds that cook easily and have a mild flavor. A few black, brown, and bicolored seeds also make good vegetable beans. At the immature stage at which they are harvested for eating, the shelled beans are yellowish green when raw and bright green when cooked.

In the Orient special varieties are considered best adapted for milk, curd, and sprouts.

Some of the desirable garden varieties for green and dried beans, classified as to their length of growing season, are as follows:[6]

Very early (100 days or less)—
Green vegetable: Agate, Giant Green, Hidatsa, Sac, Sioux.
Dry edible: Giant Green, Sac.
Early (101 to 110 days)—
Green vegetable and dry edible: Bansei, Chusei, Etum, Goku, Kanro, Kanum, Mendota, Waseda.
Medium early (111 to 120 days)—
Green vegetable: Emperor, Fuji, Hakote, Hiro, Hokkaido, Jogun, Kura, Osaya, Sato, Shiro, Sousei, Suru, Tastee, Toku, Willomi, Wolverine.
Dry edible: Emperor, Hokkaido, Jogun, Osaya, Sousei, Suru, Toku, Willomi, Wolverine.
Medium (121 to 130 days)—
Green vegetable: Funk Delicious, Hahto, Illington, Imperial.
Dry edible: Funk Delicious, Illington, Imperial.
Medium late (131 to 140 days)—
Green vegetable: Aoda, Chame, Higan, Rokusun.
Dry edible: Easycook, Higan, Rokusun.
Late (141 to 160 days)—
Green vegetable: Edsoy, Green and Black, Jackson, Jefferson, Nanda.
Dry edible: Edsoy, Jefferson, Nanda.
Very late (161 days or more)—
Green vegetable: Cherokee, Seminole.
Dry edible: Seminole.

Growing and Harvesting

Although seeds of vegetable varieties of soybeans are not produced in large amounts, stocks are being increased rapidly at numerous State experiment stations. Several varieties are now being handled in quantity by growers and seedsmen. State experiment stations can usually supply information as to sources of seed.

In general, the soil and climatic adaptations of the soybean are about the same as those of corn. Soybeans are, however, better suited than corn to light soils of low fertility, provided inoculating organisms are present.

[6] Varietal characteristics vary more or less with local soil and seasonal conditions, cultural methods, and sources of seed. The recommendations are based on observations made at Arlington Farm, Va.

Like other legumes—beans, peas, clover, and alfalfa, for example—soybean plants are able to utilize the nitrogen of the air through the action of bacteria in nodules on their roots. The soybean has its own species of bacteria, and those from other legumes will not grow on it. Where the crop is grown for the first time, soybeans may make a rather indifferent growth. Better growth can be obtained by inoculating the seed with cultures of the proper bacteria or by applying soil to the seedbed from a field where soybeans have been grown within the past 2 or 3 years. Many State experiment stations furnish pure cultures of soybean bacteria at cost, and commercial seed firms also sell them.

The best results with soybeans are obtained on a well-prepared seedbed. It is usually most satisfactory to prepare the land in the same way as for corn. A firm seedbed with a shallow covering of finely pulverized, mellow soil, well smoothed by a harrow or rake, is best.

When soybeans follow corn on fertile land, they should produce a good crop without direct application of fertilizers. The use of fertilizers, however, is recommended on sandy soils or soils of low fertility, the best results being obtained with stable manure or superphosphate and muriate of potash. Wood ashes may be used if the potash is not available. Commercial fertilizers should be thoroughly worked into the soil before seeding is done. Soybeans will grow on acid soils, but for best results the acidity should be corrected with lime.

Vegetable soybeans may be sown during a period extending from early spring until midsummer, depending largely on latitude. The best time for seeding is after the soil has become thoroughly warm, when conditions are most favorable for the best germination and rapid growth. To have fresh green beans for a longer period, plant varieties maturing at different times or a succession of plantings of the same variety at intervals of 10 to 15 days.

Vegetable soybeans are planted in rows far enough apart to permit cultivation. Three feet has been found a satisfactory distance between rows, although the very early varieties may be planted in rows 2 feet apart. For the small home garden, the seed may be dropped by hand in a furrow opened with a hoe or garden plow. Spacing of the seed 2 to 3 inches apart in the row is desirable under most conditions. On a well-prepared seedbed and with ample moisture, a depth of 1 inch is sufficient. If the soil is loose and dry or very dry and sandy, a depth of 2 to 3 inches is advisable.

With soybeans, as with most other crops, it is important to control weeds while the plants are small. Shallow cultivation should be given as needed to keep down weeds until the plants start to bloom. Cultivation should not be done in the early morning or after the plants begin blooming.

For use as a green vegetable, soybeans should be gathered when the beans are fully developed but before the pods have turned yellow. The length of time that the beans remain in the prime edible stage depends on the variety and weather conditions. From 7 to 10 days is about the average time that most varieties will remain in usable condition, although some varieties continue so for 14 days or longer. In the small home garden the pods may be picked at intervals of 3

or 4 days, or the plants can be pulled or cut and the pods removed later. For commercial canning, green soybeans can be harvested and handled with the equipment usually employed in the handling of green lima beans and peas. Although the yield of green shelled beans varies somewhat with varieties, the weight averages about 50 percent of the original weight of pods and beans.

For dried soybeans, allow the plants to remain in the field until the leaves have fallen and the pods are brown. Cut or pull the plants and beat out the seed with a stick. Several plants may be put in a bag and beaten.

Soybeans are attacked by a number of insect pests, but only a few of these have been reported as causing serious damage. For a comprehensive discussion of insect enemies, see Farmers' Bulletin 1520, Soybeans: Culture and Varieties.

Preparation and Cooking

Soybeans are not shelled like peas or lima beans. If they are boiled in the pod or allowed to stand in boiling water for 5 minutes and then cooled, the beans are easily squeezed out. The usual number of beans to a pod is two, but occasionally one, three, or even four are found. The fuzzy pods are inedible.

The shelled soybeans are washed and boiled in lightly salted water, one cup to a pint of beans, for 15 to 30 minutes. Some varieties cook more quickly than others. They may be steamed instead of being boiled. Or they may be boiled in the pod 25 or 30 minutes, cooled, and shelled; the shelled beans may then be cooked 5 to 10 minutes more before serving if desired.

Cooked soybeans (fig. 4) have a firm texture, neither soft nor mealy, a bright-green color, and a distinctive flavor. They may be seasoned simply with salt and table fat or served with crisp bacon or salt pork. The table fat may be seasoned with soy sauce. Soybeans may also be scalloped with tomato sauce or white sauce and bread crumbs. Cold cooked soybeans are excellent in vegetable salads.

Commercially canned vegetable soybeans are increasingly available at grocery stores, and soybeans may be canned at home by the same methods as peas or lima beans. Preservation of green soybeans by quick freezing has been successful experimentally, the frozen product being highly satisfactory in color, texture, and flavor.

The dry mature beans of the vegetable varieties are used in practically the same way as other dried beans. Differences are that soybeans should always be soaked overnight before being cooked, and some varieties take longer to cook. To bake soybeans, first boil them gently for about 2 hours. After adding such seasonings as salt pork, tomato sauce, mustard, brown sugar or molasses, and a couple of tablespoons of flour, bake them for 3 to 4 hours in a slow oven (fig. 5).

SOYBEAN "MILK"

A liquid somewhat similar to milk can be made from soybeans. This "vegetable milk" is not equal to cow's milk in food value but contains most of the same food elements in slightly smaller amounts. It can be used in making custards, soups, breads, cakes, sauces, and

drinks such as cocoa, and it can be drunk as a beverage with a little salt and sugar to season it.

Many varieties of soybeans have been tested by Department of Agriculture and other research workers to determine those from which the best milk could be made. That from the Bansei variety was found to have the least beany flavor, but satisfactory milk was made from the Hokkaido, Haberlandt, Mammoth Yellow, Dixie, and Rokusun varieties. More than 30 methods were tested, but the two

FIGURE 5.—Substantial fare for a winter evening—a steaming casserole of savory baked soybeans and salt pork.

that have been used for centuries in the Orient gave the best results. These are as follows:

METHOD 1.—Wash dry soybeans and soak them overnight. Remove the skins by rubbing them off in the water; they will float to the surface and can be discarded. Grind the beans fine in a food grinder. Put the ground beans in a cheesecloth bag and immerse it in a bowl of lukewarm water, using 3 quarts of water to a pound of the dry beans. Work thoroughly with the hands for 5 to 10 minutes, then wring the bag of pulp until it is dry. Boil the creamy white liquid over a low fire for 30 minutes, stirring frequently to prevent scorching. Add sugar and salt to taste. Keep in a cold place.

METHOD 2.—Wash soybeans, dry them thoroughly, then crack them by crushing coarsely in a food grinder. The skins can then be easily removed. Grind fine in the grinder. To each pound add 3 quarts of water and soak for 2 hours. Boil for 20 minutes, stirring constantly, then strain through cheesecloth. Add sugar and salt to taste. Keep in a cold place.

The pulp that is left is of good nutritive quality but has very little flavor. It can be used, however, in combination with foods of more pronounced taste. It makes a good base for macaroon-type cookies, for example. If it is to be used, it should be cooked in a double boiler for about an hour. Add one-half teaspoon of salt to each pint of mash, and, if necessary, moisten it with soybean milk. Keep in a covered jar in a cold place.

SOYBEAN CURD

A curd can be made either by adding vinegar to soybean milk or by letting the milk ferment naturally in a warm place. Using vinegar makes a firm curd; fermentation gives a curd with texture like that of cream cheese. The best varieties of soybeans for curd are the yellow types.

To make soybean curd with vinegar, heat 2 quarts of soybean milk to about 180° F., add 1 cup of vinegar, and mix thoroughly. Let stand a few minutes while the curd forms. Put in a cheesecloth bag and dip in cold water several times to wash away the excess acid. Drain for about an hour and then press out the remaining liquid. Season with salt and pack tightly in a dampened mold, cover, and store in a cold place until firm enough to cut.

To make soybean curd by fermentation, keep the milk in a warm place overnight or until it forms a curd. Stir to break the curd. Add an equal quantity of water heated almost to boiling and let stand for 10 minutes. Pour into a cheesecloth bag and drain for several hours. Press out the remaining liquid. Season with salt and pack in a dampened mold. Cover and store in a cold place.

Oriental peoples use soybean curd with hot cooked vegetables and in soups. It may also be added to omelets, creamed eggs, and other such dishes.

Since the naturally fermented curd has the consistency and somewhat the appearance and flavor of mild soft cheese, it can be seasoned and used as stuffing for celery stalks, green pepper rings, or raw tomatoes. Another way to serve it is to mix it with salad dressing and form balls to serve on crisp lettuce or use as a garnish for mixed vegetable or fruit salads.

SOYBEAN SPROUTS

A year-round fresh vegetable that may be used raw or cooked can be obtained by sprouting soybeans in a flower pot or strainer. Peking, Cayuga, and Otootan are good varieties for sprouting because they germinate quickly and uniformly. Other varieties, however, can be used satisfactorily for this purpose.

One-fourth pound (one-half cup) of dry beans of some varieties weighs about a pound when sprouted and may make as much as 5 or 6 cups of sprouts. Other varieties may yield only 2 to 3 cups. Flowerpots 6 to 7 inches in diameter at the top and 6½ to 7 inches high are large enough to allow for the expansion in volume. Rustproof wire netting or cheesecloth can be used to cover the hole in the bottom of the pot to prevent the beans from falling through and at the same time allows for drainage.

Sort the dried soybeans, discarding shriveled and dead-looking ones. Wash the good beans thoroughly; then soak them overnight in 1½ cups of lukewarm water. In the morning drain the beans, put them in the flowerpot, and cover them with dampened cheesecloth. Put a piece of damp cardboard over the top of the pot and weight it down. Keep the pot in a dark place at about 78° to 80° F.

Three times a day pour water over the soybeans, draining it off immediately. Take care not to break the tender sprouts as they appear. Each evening sprinkle the beans with chlorinated lime solution to keep down mold growth and bacterial spoilage. The solution is made by dissolving 1 teaspoon of calcium hypochlorite in 3 gallons of water. This amount will treat 5 to 6 pounds of dry beans and may be stored to use with successive sproutings.

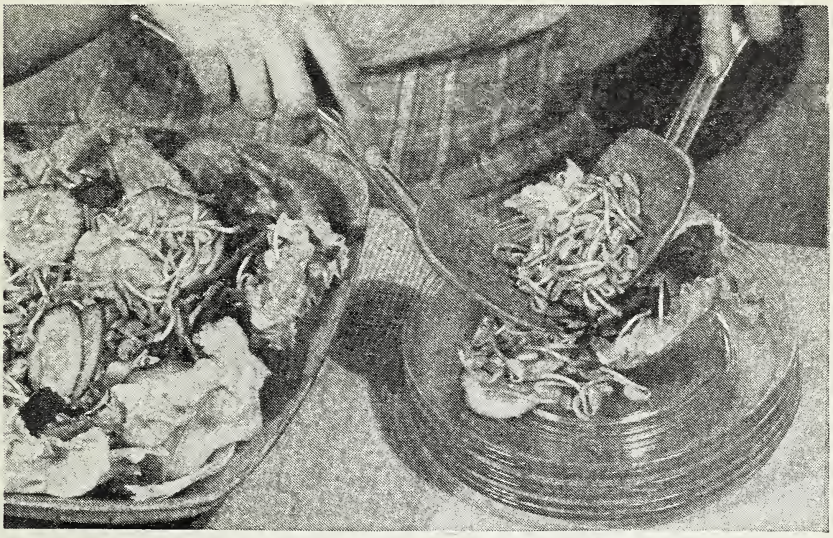

FIGURE 6.—Fresh, crisp soybean sprouts give new flavor and food value to a raw-vegetable salad.

Soybean sprouts are ready to use when they are 2 to 3 inches long. Both beans and sprouts are eaten. The loose skins may be removed by washing thoroughly. Sprouts can be served raw in salads (fig. 6), or they can be cooked in various ways or used in such dishes as omelets, stews, fricassees, or chop suey. They are very tender and lose their crispness if put into hot dishes more than a few minutes before serving.

Two good ways of cooking soybean sprouts are:

1. Boil sprouts gently in a small amount of salted water in a covered pan for 10 to 12 minutes. Drain and season with salt, pepper, and a little table fat.

2. Melt a small amount of fat in a frying pan. Add the sprouts and a little hot water, cover, and cook for 10 minutes, stirring frequently. Leave the cover off for the last few minutes to allow the sprouts to brown. Season with salt. Onions may be combined with the sprouts if desired.

OTHER EDIBLE SOYBEAN PRODUCTS

Not all the ways in which the versatile soybean and its products are used have been described. Soy sauce, for example, is widely used as a condiment in this country as well as in the Orient. It is the principal ingredient in Worcestershire sauce. The dark-brown liquid is prepared from cooked and ground soybeans mixed with roasted and pulverized wheat (or sometimes barley), salt, and water. The mixture is inoculated with a culture known as rice ferment and left to work for 6 to 18 months.

Soya crackers and breakfast foods, a coffee substitute, and salted soys are more or less familiar. In fact, from soup to nuts, from breakfast cereal to dessert (fig. 7), soybeans and soya products can contribute concentrated nourishment to a wide variety of foods.

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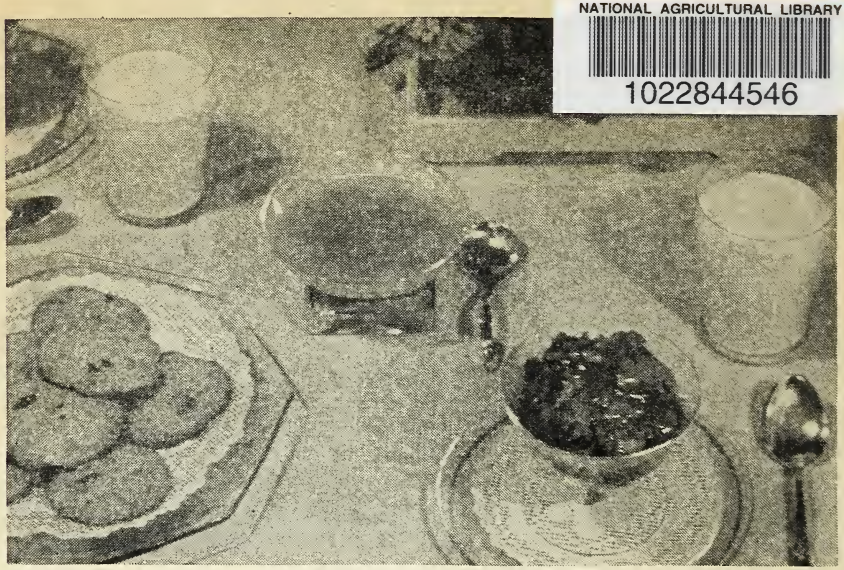

FIGURE 7.—Soybeans for dessert—a soya apple betty, in which soya grits and apples are combined. The cookies contain soya flour.

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